

secunda ante medium tertiamque prope maculam apicalem, abbreviatis).

Long. 7 lin., lat. 2 lin.

Shining piceous black; the mouth, palpi, antennæ, the base and apex of the elytra, the legs (except the middle of the thighs and the knees, which are black), and the termination of the abdomen pale rufous. Thorax constricted transversely before and behind, the sides angled. Elytra punctate-striate—six striæ, the second abbreviated before the middle, the third near the apical spot.

One specimen. This also is a Brazilian genus.

[To be continued.]

XV.—On two New Species of Subspherous Sponges, with Observations. By H. J. CARTER, F.R.S. &c.

[Plate XIII.]

AT the request of my kind friend Dr. J. E. Gray, I have examined, described, and illustrated the two following Sponges belonging to the British Museum. Both appear to me to be new, and one the type of a new genus. The former is a *Tethya*, and, from its dark purple colour externally, will be designated "*atro-purpurea*;" and the latter, from its asperity externally, will be generically termed "*Trachya*," and specifically "*pernucleata*," from the number of nucleated groups of spicules internally.

Let us direct our attention to the former first.

*Tethya atro-purpurea*, mihi. Pl. XIII. figs. 1–10.

Sessile, subcircular, convex, compressed, muricated externally, presenting a radiated structure inferiorly, where it appears to have been excised horizontally from the object on which it grew. Surface covered with a dark purple, smooth layer of sarcode, interrupted by the spine-like projections which give it the muricated appearance, and which are composed of bundles of spicules, now truncated by fracture (Pl. XIII. fig. 5, *a*), but which probably, in the natural state, protruded from them in a brush-like form (fig. 6); raised into aliform ridges (fig. 5, *b*) extending from the base of one spine to the other, and thus forming polygonal interspaces in which are situated the pores, with here and there an osculum. Internally composed of radiated structure consisting of long, straight spicules extending, in bundles, from the centre of the base to the periphery (fig. 4, *a*), imbedded in a light-brown

coloured sarcode, densely charged with a peculiar sigmoid spicule, and permeated in all directions by the canal-system (*d*), which is most dilated about midway between the centre and the circumference, but so amorphous as to represent an areolar vacuolation rather than a branched structure; limited at the surface by a condensed cortical layer of the sarcode, neatly defined on its inner margin, by its dark purple colour, from the light-brown-coloured sarcode of the interior (*b*). Spicules of the radiated structure of three kinds (fig. 7), viz.:—1, stout, long, straight, smooth, fusiform, acerate (*a*); 2, trifold extended or furcate (*c*); and, 3, trifold recurved or anchorate; the last two with very long, delicate, slightly fusiform, smooth, straight, pointed shafts. Spicules of the body or light-brown sarcode of the interior of two kinds (figs. 8 & 9), viz.:—1, stout, short, slightly curved, smooth, fusiform, acerate, with one half generally a little larger than the other (fig. 8); and, 2, minute, doubly sigmoid, or circular (that is, sigmoid in opposite directions, or spiral), contort (fig. 10, *a, b*), sparsely spinous on the shaft, and terminated at the extremities by three diverging spines about the same size—something between a hamate and an anchorate form; spines of the shaft vertical, pyramidal, chiefly situated upon the prominent parts of the shaft. This spicule is so numerous as to form the greater part of the bulk of the fleshy substance. Size of sponge 11-12ths of an inch in horizontal, and 3-12ths of an inch in vertical diameter.

*Loc. et hab.* Unknown.

*Obs.* Described in a dried state, aided by soaking in water &c. Probably convex on its surface throughout, when fresh, but now possessing the depression in the centre, as represented in the figure, which seems to have arisen from collapse of the vacuolar or canal-system internally during desiccation.

The dark-purple colour and muricated surface are striking features of this sponge. All the spine-like processes are truncated; but probably, in their original and uninjured state, each had a pencil of spicules extending beyond the sarcode (fig. 6), composed of a variable number of the kinds above described as peculiar to the radiated structure, the furcate and anchorate heads of the long-shafted spicules being outermost, while the simple points belong to the stout acerate spicule, which accompanies and contrasts forcibly with them in its robustness and inferiority of number.

These characters, with the smooth polygonal areas in which the pores are situated, and here and there an osculum, together with the radiated structure internally, limited by the cortical condensation of the sarcode at the circumference, which thus

keeps all the elements of the surface in proper position, coincide strictly with what has been stated and figured of *Tethya cranium* (Johnston, Hist. Brit. Spong. pl. 1. figs. 1 &c.) and of *T. arabica* (Annals, 1869, vol. iv. pl. 1. figs. 1 &c.).

The sigmoid spicules, too, evidently exist in both these species of *Tethya*, in a minuter form (Bowerbank, Brit. Spong. vol. ii. p. 85, and Annals, *l. c.*), but being so much larger in *T. atro-purpurea*, where they can be easily seen in detail with a quarter-of-an-inch compound power, are thus much more satisfactorily illustrated.

I could not discover any gemmules.

Besides being sessile, this species might occasionally exist in a subspherous form, free and unattached, like *T. arabica*, as I know from actual experience such to be the habit of these *Tethyæ*. But the specimen under description appears to have been cut off from the rock or object on which it grew, and that, too, a little above its real base, as there is no nucleus present in the latter, nor any point indicative of the centre from which the mass emanated; probably this was left upon the rock.

#### TRACHYA, nov. gen., mihi.

*Gen. char.* Asperous, massive, cake-shaped, free or fixed, dense, rigid. Osculiferous. Internally multinucleate. Spicules of two kinds only, viz. large and small: large spicule smooth, fusiform-acerate; small spicule, which is chiefly confined to the upper surface, smooth, fusiform-acuate.

*Trachya pernucleata*, n. sp. mihi. Pl. XIII. figs. 11-16.

Free, subcircular, compressed, convex above, concave below. Superiorly asperous, lobate, irregular, of a dark-grey colour, presenting here and there an osculum amidst the projecting points of the spicules vertically arranged which, together with condensed sarcode and minute depressions for the pores, form a continuous rigid surface (Pl. XIII. figs. 11-13). Inferiorly equally asperous, of a lighter colour, presenting here and there oscula more or less situated in groups in depressions (*c*), but with the spicules lying on or inclined towards the surface, in flattened whorls or radiated groups (fig. 15), not projecting vertically, as on the upper surface (fig. 13). Internally composed of an extremely dense structure formed chiefly of nuclear masses of spicules radiating from their centres respectively, and intermingling with each other or extending to the exterior, where they terminate above in the vertical arrangement just mentioned, strengthened by the addition of a much smaller spicule, of a different form, thickly set in between the

larger ones (fig. 13, *b b*); while below the smaller spicule is more or less absent, and the radiating spicules become inclined towards the surface in the whorls, as above noticed (fig. 15). Canal-system distinct, but correspondingly condensed and small in its cavities, in accordance with the compact structure of the sponge generally; presenting no evident arborescent form, but general diffusion between the nuclei (fig. 14 *b*). Spicules of two kinds only (fig. 16), viz.:—1, stout, straight, smooth, fusiform, acerate or pointed at each end (*a*); and, 2, small, straight, smooth, slightly fusiform or acuate, pointed at one end only and the other rounded or obtuse (*b*). This spicule is, as above stated, chiefly confined to the *upper* surface, where, arranged vertically, with its sharp end outwards, among the points of the larger spicules, it contributes greatly to strengthen the surface and form a kind of crust. Size of sponge  $2\frac{1}{4}$  inches by  $1\frac{7}{8}$  inch in horizontal and  $\frac{4}{12}$  inch in vertical diameter.

*Loc. et hab.* Vera Cruz, Mexico.

*Obs.* Described in the dried state.

At first this sponge looks very much like a *Tethya*; but the absence of the furcate spicules, together with its other differences in structure, soon shows that it cannot be classed with *Tethya* generically. Then the absence of the crust of globular crystalloids peculiar to the *Geodidæ*, with its numerous other differences from these, points out that it cannot be generically classed with either *Geodia* or *Pachymatisma*. And yet its dense rough character and cake-like free form evidently ally it to the subspherous sponges, so that it becomes necessary to form a new genus for it in this family. Hence it has been called "*Trachya*," from its asperous nature, which, although not a legitimate transformation of the word grammatically, nevertheless linguistically euphonizes sufficiently well with *Tethya* and *Geodia* to induce me to adopt it.

It will have been observed that, although *Trachya* has not the exact elements of *Tethya* or *Geodia* for its crust, yet the addition of the small spicule arranged vertically in great numbers among the projecting points of the large ones on the upper surface (fig. 13) supplies this apparent deficiency; while the number of nuclear centres in the internal structure not only causes the species to distinctly differ widely from *Tethya* and *Geodia*, but to assume that hardness and rigidity characteristic of the subspherous sponges which nothing could impart better than this knotted structure.

#### *General Observations.*

I have also examined a third sponge belonging to the Museum, which has grown upon the root of a palm-tree; and this

is evidently a variety of *Geodia arabica* (Annals, 1869, vol. ii. l. c.), differing only in the canal-system being less arborescent and the ends of both the shafts and branches of the large tri-radiate spicules of the circumference being frequently obtuse, rounded, or inflated—thus more resembling *Pachymatisma*. But the body-spicule of *Pachymatisma*, being round or inflated at both ends, alone distinctly separates it from *Geodia*; while *Tethya lyncurium*, from the absence of the furcate spicules, on the one hand, and the position of the large stellate spicules (which are for the most part situated on the *inner* side of its cartilage-like crust), on the other, is neither a *Tethya* nor a *Geodia*, nor a *Pachymatisma* (see my figures, 'Annals,' l. c.). Hence *Tethya lyncurium* should also have a separate genus.

As regards the describing of sponges generally, it is very desirable that no spicule should be figured in connexion with them which is not strictly characteristic of the species. The introduction of varieties and monstrosities, with which every specimen more or less abounds, I am persuaded is as much a mistake as it would be to omit them from a dissertation devoted to the formation and development of the spicule generally. Here the varieties and monstrosities might appear to advantage; but figured with the characteristic spicules of the species in which they may have been observed, they are only calculated to confuse and mislead.

I have therefore, although I have found different hamate and stellate spicules about the specimen of *Tethya atro-purpurea* (above described), regarded them as adventitious products, which it is more desirable to retain mounted in balsam for the purpose mentioned than to figure any of them, even as such, in connexion with the spicules of this sponge.

Again, it should be remembered that sponges grow together like grafts upon a tree-stock; and thus, besides varieties, monstrosities, and adventitious spicules accidentally incorporated with the mass during its growth, there may be others actually developed in the midst of it. Thus, at the circumference of *Tethya arabica*, I found a group of tri-radiate spicules similarly developed and situated to those at the circumference of *Geodia arabica* (Annals, l. c. p. 4), whose explanation at the time I did not understand; but now it appears to me that, as different species of sponges are frequently found growing together in much the same condition as grafts on a tree-stock, this might have arisen from a gemmule of a neighbouring *Geodia*, which had accidentally impinged upon the *Tethya*, and, growing there, had thus become incorporated, and had produced the group of tri-radiate spicules to which I have alluded.

Hence, in the description of beings so naturally prone to adhere and grow together, to produce varieties and monstrosities in their spicules, and to incorporate with themselves adventitious and external objects, as the sponges, it is very desirable to ascertain what really does and what does not belong to them, and to figure that only which is characteristic of them, of normal form and dimensions.

EXPLANATION OF PLATE XIII.

- Fig. 1.* *Tethya atro-purpurea*, n. sp., dried state, natural size; upper surface: *a*, spine-like projections.  
N.B. The depression in the centre externally has probably arisen from collapse of the vacuolar or canal-system internally during desiccation.
- Fig. 2.* The same, horizontal section of the base (probably produced by the cutting of the sponge from the body on which it grew), showing:—*a*, spine-like projections; *b*, dark cortical layer of the circumference; *c*, portions of the radiating bundles of spicular structure imbedded in the fleshy substance of the interior; *d*, fleshy substance; *e e*, cavities of the canal-system.
- Fig. 3.* The same, imaginary section, to show the vertical diameter of the specimen.
- Fig. 4.* The same, segment, magnified a little more than two diameters, showing:—*a*, spine-like projections; *b*, dark cortical layer; *c*, radiating bundles of spicules extending from the centre to the spine-like projections on the circumference; *d*, fleshy substance of the body; *e*, cavities of the canal-system.
- Fig. 5.* The same, portion of the surface, magnified four times, showing:—*a*, the relative position of the spine-like projections, with their truncated ends, exposing the fractured extremities of the spicules of which they are composed, as indicated by the black points; *b*, wing-like ridges of the superficial layer of sarcode extending outwards from the bases of the spine-like bodies, and thus forming polygonal areas in which are situated the pores, as indicated by the dark points.
- Fig. 6.* The same, a spine-like projection, magnified, to show its probable state before the protruding ends of the spicules were broken off.
- Fig. 7.* The same, spicules of the radiating bundles, relatively magnified: *a*, straight, stout, smooth, fusiform, acerate spicule; *b*, real length, about 1-7th of an inch, greatest thickness about 4-1800ths of an inch; *c*, trifid, extended, or trifurcate spicule, with long, delicate, smooth, pointed shaft; *d*, real length, about 1-5th of an inch, greatest thickness about 1-1800th of an inch; *e*, trifid, recurved, or anchorate spicule, with long, delicate, smooth, pointed shaft; *f*, real length, about 1-5th of an inch, greatest thickness about 1-1800th of an inch; *g, h*, more magnified figures of the trifurcate and anchorate heads respectively.
- Fig. 8.* The same, body-spicule of the fleshy substance: short, stout, smooth, fusiform, slightly curved, acerate, generally larger on one side than the other; 1-30th to 1-20th of an inch long, and 3- to 4-1800ths of an inch in its thickest diameter.
- Fig. 9.* The same, portion of the fleshy substance, much magnified, to show how densely it is charged with the contort sigmoid spicules.

*Fig. 10.* The same, two of the sigmoid spicules, greatly magnified, as seen with a quarter-of-an-inch compound power, showing the spines on their shafts and extremities respectively: *a*, sigmoid form; *b*, circular form. Size about 1-400th of an inch long, and about 1-12000th of an inch thick.

N.B. These spicules have a double sigmoid or spiral curve, consisting of about two turns of the spire altogether, but so different individually that it is only here and there that a true sigmoid form is seen, the rest presenting a curvilinear one like a fragment of a circle (*b*); yet they are all contort, and could not be made to lie *flat* on a plane surface.

*Fig. 11.* *Trachya permucleata*, n. gen. et sp., dried state, half the specimen, natural size, upper surface: *a*, oscule.

*Fig. 12.* The same, portion of upper surface, greatly magnified, to show:—*a*, the depressions in which the pores are situated; *b*, the ridges between them formed by the projecting points of the large and small spicules, which have been broken off, as indicated by the black circular dots.

*Fig. 13.* The same, diagram to show the relation of the large to the small spicules, and their vertical arrangement so as to form a hard crust on the upper surface: *a a*, large spicules; *b b*, small spicules.

*Fig. 14.* The same, horizontal view of vertical section of corresponding half of fig. 11, natural size, showing internal structure composed of:—*a a*, nuclear or radiating groups of spicules; *b*, cavities of canal-system; *c*, group of oscules in a depression in the lower surface.

This section also shows the dark-grey colour of the upper portion passing into the lighter one of the under surface.

*Fig. 15.* The same, whorl or radiating group of large spicules, much magnified, to show their superficial arrangement on the under surface of this sponge, and the comparative absence of the small spicule.

*Fig. 16.* The same, the large and small spicules, relatively magnified: *a*, large spicule, stout, straight, smooth, fusiform, acerate; *b*, real length, about 1-18th of an inch, greatest thickness about 3-1800ths of an inch; *c*, largest size of small spicule, straight, smooth, fusiform, acute (that is, needle-shaped or pointed at one end and obtuse at the other). Size about 1-60th of an inch long by about 1-1800th of an inch in its greatest transverse diameter.

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XVI.—*Notice of a new Vitreous Sponge, Pheronema (Holtenia) Grayi.* By W. SAVILLE KENT, F.Z.S., F.R.M.S., of the Geological Department, British Museum.

THE recent dredging-expedition of the yacht 'Norna,' owner and commander Mr. Marshall Hall, F.G.S., in which I had the pleasure of being associated with Mr. Edw. Fielding, resulted in our obtaining, off Setubal, in addition to many other most interesting organisms, a vitreous sponge closely allied to *Holtenia Carpenteri*, Wyv. Thomson. At the time of taking it I strongly suspected it to be identical with